

The Latest Technology in Sport Aviation



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Kent Misegades

- **Degrees in Mechanical Engineering (NCSU, Auburn) and Applied Aerodynamics (VKI DC 1979-1980)**
- **30+ year career in engineering and management**
- **Director, Thales Academies private K-12 schools**
- **Pilot since 1973, President EAA1114, Apex, NC**
- **Founded AeroSouth in 2008**
 - Aviation Photojournalism
 - Aerodynamic design



Topics

- **What is Sport Aviation?**
- **Myths and Reality**
- **Top Ten Innovations from AERO 2010**
- **Belgium Examples**
- **Famous homebuilders**
- **Sport Aviation Associations**
- **Major Sport Aviation Events**



What is Sport Aviation?

- **Non-commercial aviation, i.e. flying just for the fun of it!**
- **Any and all types of aircraft**
 - Legacy aircraft, i.e. Beech, Cessna, Piper, Robin, etc.
 - New LSA/UL aircraft, i.e. Remos, FD, Tecnam, Paradise, etc.
 - E-AB, Experimental Amateur Built (homebuilts)
 - Warbirds, Aerobatics, Sailplanes, Rotorcraft, Gyrocopters
 - Ultralights
 - Unpowered: hang gliders, parasoaring
 - Powered parachutes & trikes
 - Three-axis lightplanes



What is Sport Aviation?



Why is SA is Important

- There are only a **dozen** or so large commercial and military manufacturers left (Airbus, EADS, etc.). **Nearly all of these were started by one person trying to fly.**
- Most commercial/military pilots start as sport pilots.
- There are **hundreds** of small companies building sport aircraft, with a dozen or more new ones each year.
- The **effort** to design, build and certify a sport aircraft is much lower than for others, allowing **lower costs** and **greater innovation**. **Owners are driven mostly by passion.**



Myths and Reality #1

- **Myth #1 – only the very rich can afford to fly**
- **Reality**
 - **Private pilots come from all backgrounds.**
 - **Pilot license costs are comparable to learning driving/boating/skiing/golf/tennis/riding/motorsports.**
 - **A new small aircraft can cost as little as a family car.**
 - **Homebuilt/Used/Club aircraft can be very affordable.**

Myths and Reality #2

- **Myth #2 – small aircraft are dangerous**
- **Reality**
 - **Private pilots are very well trained and safety conscious.**
 - **Accident rates/1000 hours is comparable to driving a car or a boat and have been dropping for many years.**
 - **Accident rates for homebuilt aircraft are comparable to factory-built aircraft.**

Myths and Reality #3

- **Myth #3 – small aircraft are bad for the environment**
- **Reality**
 - **While leaded fuel (100LL) is still in use for 20% of the piston engine fleet, the amount is miniscule compared to former use of leaded fuel in cars. 100LL is being phased out in the next 10 years.**
 - **Modern aircraft are very fuel efficient and quiet.**
 - **Airfields are a haven for wildlife needing open spaces.**

Myths and Reality #4

- **Myth #4 – homebuilt aircraft are poorly designed & built**
- **Reality**
 - **Most homebuilt aircraft are designed by degreed engineers with aerospace industry experience. Many serve as the basis for production aircraft (e.g. Cirrus)**
 - **Homebuilt aircraft make use of the latest technology as they are not constrained by bureaucrats. (e.g. electrics)**
 - **Homebuilder organizations, aviation authorities and competition result in safe, strong aircraft.**

Top Ten Innovations from AERO Friedrichshafen 2010

- Europe's largest trade show for **General Aviation**.
- Held annually in **Friedrichshafen**, Germany in April. **Dornier!**
- **500 Exhibitors** from Europe, Americas and Asia
- Showcase for the **latest innovations** in aircraft and powerplants.
design, composite material applications, avionics and fun flying.
- KM reports annually to the **EAA members**; see EAA.org

Top Ten from AERO 2010 - #1



Dyn Air TwinR

- Darois, France, www.dynaircraft.com
- Christophe Robin, designer
- Light Twin Rotax, carbon fiber
- Slotted flap and cambered rudder
- Very efficient, 4-place aircraft



Top Ten from AERO 2010 - #1

Dyn Air TwinR slotted flap and cambered rudder

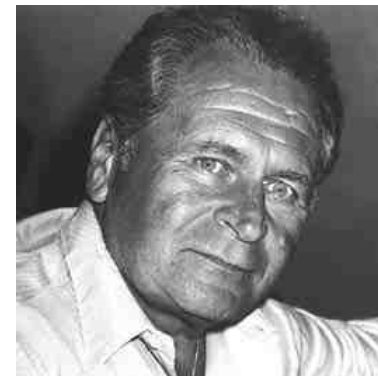


Top Ten from AERO 2010 - #1



Dyn Aero in Portugal

- www.aerocork.com
- www.nomacorc.com, Zebulon, NC
- Belgian businessman and wine connoisseur Gert Noël



Top Ten from AERO 2010 - #2



PC-Aero Elektra One

- Landsberg am Lech, Germany,
www.pc-aero.de
- Design by Calin Gologon and V-Plane of Hamburg
- Geiger Engineering motors
- CAFÉ Foundation contestant
- First in series of production A/C

Top Ten from AERO 2010 - #3



Oratex Covering

- Leipzig, Germany, www.oracover.de
- Microballon encapsulated hardener
- Developed originally for model aircraft
- Lowers weight, much simpler to apply



Top Ten from AERO 2010 - #4



Dallair Aeronautica FR-01 and EPA Power Rotax

- Naples, Italy, www.dallair.com

- San Pietro Mosezzo, Italy,

www.epapower.com

- FR-01: LSA/UL class, fully aerobatic, lowers cost for aerobatic

- EPA Power conversion of 80HP

Rotax 912, airbox, fuel-injection



Top Ten from AERO 2010 - #5



Woopy Jump & Woopy Fly

- Aigle, Switzerland, woopyjump.com
- Electric-powered Ultralight
- Evolved from desire to improve safety of parasailing; R/C models
- Mark Drela of MIT helped with detailed X-Foil airfoil design
- Look for Woopy Jump on ski slopes
- The one-hour Woopy concept



Top Ten from AERO 2010 - #6



Millennium Master and Shark

- Landshut, Germany,

www.millennium-aircraft.com

- Hlboké, Slovak Republic,

www.shark.aero

- 300 kmh carbon-fiber, Rotax powered, tandem cruisers

- Typical of advanced use of composites and superb aero design



Top Ten from AERO 2010 - #7



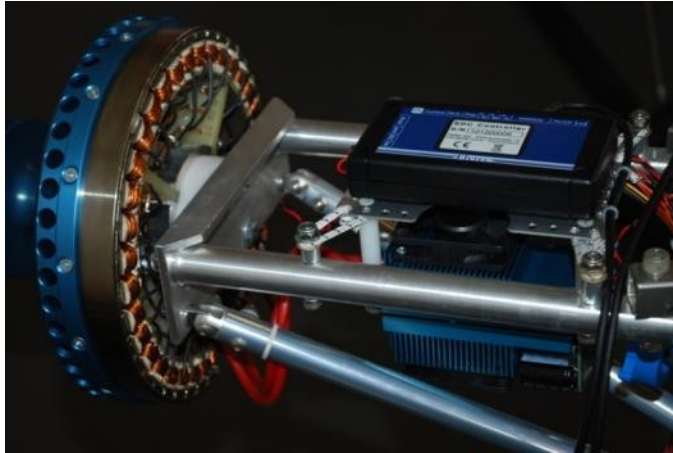
AutoGyro Calidus & Rotortec Cloud

Dancer II Gyrocopters

- Hildesheim, Germany, www.auto-gyro.com
& Görisried, Germany, www.rotortec.com
- All carbon-fiber, high-performance A/C
- Result of REDUCED government regulations of rotorcraft in Germany



Top Ten from AERO 2010 - #8



Electric Propulsion Systems from Flytec Instruments

- Horw, Switzerland, www.flytec.ch
- Lightweight, brushless motors (appliances, etc.)
- Latest battery, controller & charger technology
- Microlights today, ULs soon



Top Ten from AERO 2010 - #8



Icaro 2000 Nano Trike Electric

- Sangiano, Italy, www.icaro2000.com
- Designed by Austrian Manfred Ruhmer, 3-time world-champion hang glider pilot
- Swiss Fly-Tec Electric propulsion
- German Geiger Engineering motor
- Laminar wing from Ruhmer

Top Ten from AERO 2010 - #9



LF26 light weight, low-cost engine

- D-Motor, Deerlijk, Belgium
- www.D-MOTOR.eu
- 47 Kg, 80 HP water-cooled 4-stroke engine
- Installed in French X-Air F



Top Ten from AERO 2010 - #10



Becker Avionics

- Latest generation of MFDs
- GPS-based
- Moving Map with weather overlay
- 3D terrain data
- Traffic display

Four Belgian Examples - #1



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Four Belgian Examples - #2



Swift foot-launched glider

- Aerie, Gembloux, Belgium, www.aerie.com
- Manfred Ruhmer design
- gas or electric power pods



Four Belgian Examples - #3



Twin Bee STOL Light Plane

- Airflow, Brussels, www.twinbee.be
- STOL wings from Italian Savannah



Four Belgian Examples - #4



SC07 Sport Cruiser

- B.O.T. Aircraft, Triesen, Liechtenstein
- www.bot-aircraft.com
- “T” is for Thibaud Berlinmont, co-owner and **Belgian** composites expert



Some Famous Homebuilders

- **Theodor von Kármán**
- Paul Poberezny
- Richard van Grunsven
- Antony Fokker
- Ernst Heinkel
- Wilbur & Orville Wright
- Burt Rutan
- Pascale brothers
- Clyde Cessna
- Louise Blériot
- Ernst Heinkel
- Count Ferdinand v. Zeppelin
- Geoffrey de Havilland
- William Boeing
- Glenn L. Martin
- Henri and Marcel Farman

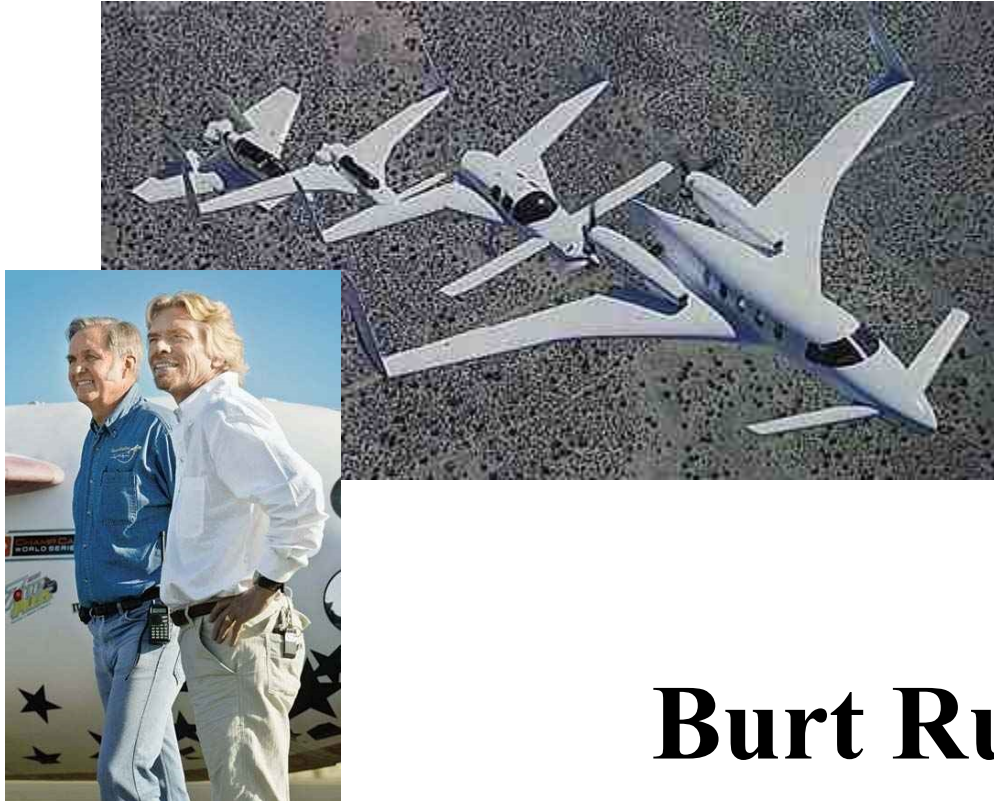
Some Famous Homebuilders



Theodor von Kármán
Constructed early helicopter with
Istvan Petrochy in 1917-1920



Some Famous Homebuilders



Burt Rutan

**Model airplanes, VariEze, Scaled Composites,
Northrop-Grumman, Virgin Galactic**

Some Famous Homebuilders



Dr. Bertrand Piccard

1999 – Breitling Orbiter 3 circles the globe

2012 – SolarImpulse to circle globe on solar power

Solar Impulse



Like what you see?

Join the EAA! www.eaa.org

- Monthly magazine Sport Aviation (and others)
- Separate divisions for homebuilders, warbirds, vintage, aerobatics, ultralights and instruction
- 160,000 members, 1000 local chapters
- Get help with flying lessons, aircraft design, construction, restoration
- Attend hundreds of seminars and workshops at AirVenture and elsewhere
- **Scaled Composites Story - important for your career**



Sport Aviation Organizations

- **International – Exp. Aircraft Assoc., EAA, www.eaa.org**
- **France – Réseau du Sport de l’Air, RSA, www.rsafrance.com**
- **Belgium – Réseau du Sport de l’Air, RSA, www.rsab.be**
- **Netherlands – Nederlandse Vereniging van Amateur Vliegtuigbouwers, NVAV, www.nvav.nl**
- **Denmark – KZ&V, www.kzklub.dk**
- **Switzerland – Exp. Aircraft Switz., EAS, experimental.ch**
- **Germany – Oskar Ursinus Vereinigung, OUV, www.ouv.de**
- **Sweden – EAA Sverige, www.eaa.se**



Sport Aviation Organizations

- **U.K. – Light Aircraft Association, LAA, www.lightaircraftassociation.co.uk**
- **Austria – Igo Etrich Club, www.amateurflugzeugbau.at**
- **Italy – Federazione Italiana Costruttori di Aeromobili Amatoriali e Storici, www.federazioneicap.it**
- **Norway – EAA Chapter 573, www.eaa573.no**
- **Spain – Asociacion de Aviacion Experimental, AAE España, www.asociacionaviacionexperimental.com**
- **Light Aircraft Manufacturers Assoc., LAMA, www.lama.bz**





The “Big Four” Events

- **U.S. Sport Aviation Expo, Sebring, FL, January**
 - Focus on Light Sport and Ultralights, sport-aviation-expo.com
- **AERO Friedrichshafen, Germany, April**
 - Covers all aspects of General Aviation, aero-expo.com
- **Sun ‘n Fun, Lakeland, FL, April**
 - Covers all aspects of Sport Aviation, sun-n-fun.org
- **EAA AirVenture, Oshkosh, WI, July**
 - Covers all aspects of Sport Aviation, airventure.org



Other European Events



Euro Fly-In Saint Yan, France, July

- ◆ Similar to EAA AirVenture, euro-fly-in-rsa.com

TANNKOSH, Tannheim, Germany, August

- ◆ Similar to EAA AirVenture, tannkosh.com



Oldtimer Fly-In, Hahnweide, Germany, Sept.

- ◆ Vintage and warbird aircraft, oldtimer-hahnweide.de



Join VKI Alumni Association



Aim High, Fly Safe

EAA1114 Apex NC

- **One of largest chapter in the US, 160+ member**
- **Monthly 3rd Saturday pancake breakfast meetings**
- **Monthly 1st Friday Builder / Movie Nights**
- **Wide diversity of speakers**
- **Fly-Outs to area airports, museums, events**
- **Annual builder training seminar in August**
- **“Something for every taste”**

